INDUSTRIAL DIAMOND ABSTRACTS

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DIAMOND MINING AND INDUSTRY

Diamonds in Siberia

S. I. Tomkeieff. *Nature* 1958 Vol 181 (4605) pp 323-324 (Feb 1)

A recapitulation is given of the information that has been published regarding surveys made since 1941 with a view to the discovery of diamondiferous areas in the U.S.S.R.

Details of the Yakutian diamond fields follow, including geological information and descriptions of the sizes, colours, and quality of the stones found.

The yield in the pipe and the alluvial diggings is given in carats per cubic metre, but no production figures or application details are available. 2 ref.

G *C 1.2*

Diamond : fiction, fancy and fact

S. Tolansky. *Discovery* 1958 Vol 19 (1) pp 10-16 (Jan)

A brief historical review of diamonds is given. The discovery of the importance of cleavage, the development of diamond dust for polishing, and the various sources of diamonds are reviewed. The increasing scientific interest in and use of the diamond today is examined. The article concludes with a section on some famous diamonds. 7 illustr.

F *C 0.1 : C 1.2 : D 2.3 : D 7.0*

The most important graphite deposits in the world. Die wichtigsten Graphitvorkommen der Welt

G. Klar. *Montan Rdsch* 1957 (12) pp 325-329 (Dec) (In German)

The graphite mines being worked during 1956 are surveyed. 51 ref.

H *C 1.25*

The millionaire in the jungle. Der Millionaer im Dschungel

H. J. Krueger. *Gold & Silber* 1958 Vol 11 (1) pp 16-17 (Jan) (In German)

Biographical note on J. T. Williamson.

H *C 1.22*

Creation of a diamond mining industry in the Yakutsk ASSR

A. A. Gribin. *Gornyi Zhurn* 1957 (11) p 33; *DSIR Transl Contents Lists Russ Period* 1958 (106) p 25 (Jan) (Original in Russian)

X *C 1.24 : C 1.5*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND AND OTHER HARD MATERIALS

Microcleavage, bonding character and surface structure of materials with tetrahedral coordination

G. A. Wolff, J. D. Broder. *Acta Cryst* 1957 Vol 10 (12) pp 848-849 (Dec 10)

Abstr of paper to the 4th General Assembly and International Congress of the International Union of Crystallography, Montreal, July 10-19, 1957.

The first and second parts deal with sphalerite and fluorite structure materials. The third section presents an analysis of the diamond structure, comparing it with As_4O_6, Sb_4O_6, Si, and Ge. Whereas in diamond there is good (111) cleavage and microcleavage between (111) and (110) along the (110) zone, which corresponds to the non-deformed surface as in the molecular diamond structure of As_4O_6 and Sb_4O_6, Si and Ge each displays a different cleavage. An examination of diamond, Si, and Ge is made which provides an explanation of the cause of the difference. Section 4 discusses structures which seldom, if ever, show distinct cleavage.

W *C 2.5*

Crystal clear

Linde Co. *Design News* 1957 Vol 12 (16) p 11 (Aug 15)

The Company has grown a sapphire disk, 5 in. in diameter, in an oxy-hydrogen furnace. Powdered aluminium oxide was fed through the flame and the melted material collected in crystal form on a seed base.

W *C 2.61*

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Diamond Conference, Oxford, 1957 : Abstracts of Talks

Anon. Book, Kennet Press, Reading, 76 pp

Abstracts of the following talks are presented: Polarization of fluorescence in diamond, by F. W. J. Mitchell and I. G. Matthews (Reading Univ); Measurements on the absorption edge spectrum of diamond, by C. D. Clark and R. J. Elliott (Reading Univ); The magnetoresistance of a p-type semi-conducting diamond and the effects of irradiation on some of the properties of semi-conducting diamonds, by P. T. Wedepohl (Reading Univ); The x-ray diffraction 'spikes' of diamond, by S. Caticha-Ellis and W. Cochran (presented by N. Wooster, Cambridge Univ); The etching of diamond cleavages, by S. Tolansky and A. R. Patel (Royal Holloway Coll); The rectilinearity of etch pits in diamond, by A. R. Patel and S. Tolansky (Royal Holloway Coll); Surface topography of graphitized diamond, by M. Seal (Cambridge Univ); Mechanism of wear of a glazier's diamond, by S. Tolansky and A. R. Patel (Royal Holloway Coll); Lubrication by lamellar solids, by J. Goodman and R. F. Deacon (Cambridge Univ); The wear of diamond on glass, by H. G. Scott (Cambridge Univ); High speed friction of metals and diamond, by E. H. Freitag (Cambridge Univ); The nature of trigons, by E. M. Wilks (presented by J. Wilks, Oxford Univ); Remarks on measuring the grinding hardness of diamond, by E. M. Wilks, (presented by J. Wilks, Oxford Univ); The thermal conductivity of p-type germanium between 0.2 and 4° K, by J. A. Carruthers (Oxford Univ); Thermal conductivity and thermal contact, by R. Berman (Oxford Univ); Electron bombardment of counting diamonds, by K. Stratton (Royal Free Hospital, London); Diamond as a scintillation counter of α-particles, by J. E. Ralph (King's Coll, London). *G* *C 2.2*

Electroluminescence. Electroluminescentie

G. Diemer. *Ned T Natuurkunde* 1955 Vol 21 pp 165-176; abstr *Philips Res Rep* 1957 Vol 12 (4) p 379 (Aug) (Original in Dutch)

Survey of existing theories and experiments on electroluminescence, including the theories of Piper and Williams, Alfrey and Taylor, and of Zalm, Diemer, and Klasens. Possible applications of the phenomenon are mentioned. *W* *C 2.24*

Heats of combustion of irradiated graphite and diamond samples

W. A. Fraser, E. J. Prosen. *Nat Bur Standards (Project 3203)* 1952 17 pp (Feb 8)—Decl Jan 18, 1957; *Nuclear Sci Abstr* 1957 Vol 11 (7) p 403 (Apr 15)

The total stored energies in irradiated samples of graphite and diamond were measured. The stored energy was determined as the difference in heats of combustion of irradiated and unirradiated samples using an oxygen bomb calorimeter. The heat of combustion of the reference sample of graphite was redetermined, and measurements of stored energy were made on one sample of irradiated diamond and 6 samples of irradiated graphite. *W* *C 2.6*

A boundary-structure theory for twinning in diamond-type crystals

J. A. Kohn. *Acta Cryst* 1957 Vol 10 (12) pp 849-850 (Dec 10)

Abstr of paper to the General Assembly and International Congress of the International Union of Crystallography, Montreal, July 10-19, 1957.

The results of back-reflection x-ray studies of a multiple-twinned silicon crystal are presented and discussed. *W* *C 2.5*

Scattering of electrons by lattice vibrations in crystals

W. A. Harrison (Ill Univ). *Dissert Abstr* 1956 Vol 16 (9) pp 1700-1701 (publ no 18,147 96 pp)

The work attempts to supply a general analysis of the scattering of electrons by lattice vibrations, and allows for comparison of the relative importance of scattering induced acoustically and optically. Crystals possessing two atoms per unit cell are studied, and the detailed form of the modes, as determined by the crystal symmetry, is developed in a manner suitable for use in a scattering calculation. It is found that a coupling between acoustical and optical modes appears in crystals in which each atom is not a centre of symmetry. Because of this coupling, there is an electrical polarization associated with acoustical modes in certain polar crystals which may be understood in terms of the piezoelectric effect.

The coupling parameters entering the expressions for the normal modes are evaluated explicitly for diamond, germanium, and silicon by constructing a force model for atomic interactions. The force constants are evaluated in terms of the elastic constants for each crystal, and particular notice is taken of the requirement that the force model should be invariant under bulk rotations of the crystal. Consideration of electron scattering in non-polar crystals is restricted to the monatomic case. *W* *C 2.5*

Adsorption at the surfaces of hard materials and its relation to hardness and reactivity. Ueber die Adsorptionsfaehigkeit von Hartstoffen und deren Beziehung zur Haerte und dem Reaktionsvermoegen

G. F. Huettig, E. Haerth. *Kolloid Zeits* 1957 Vol 155 (1) pp 95-96 (Nov) (In German)

Lectures at the 2nd Plansee Seminar 'De Re Metallica' 1955, Reutte, Tirol. Edited by F. Benesovsky, Metallwerk Plansee, Reutte, Tirol, 1956, obtainable from Springer Verlag, Wien S 8-17.

The heat of adsorption of ammonia at the surfaces of various salts is measured. A theory is developed relating this heat to the energy of formation of the ammonia salt and the energy of lattice distortion. The heat of formation of the salt can be taken as a measure of the microhardness. *H* *D 13.5*

Examination of the electroluminescence of insulating diamonds with the microscope and the oscilloscope. Mikroskopische und oszillographische Untersuchungen der Elektrolumineszenz isolierender Diamanten

E. Krautz, G. Zollfrank. *Optik* 1957 Vol 14 (10) pp 446-457 (Oct) (In German)

The electroluminescence of type I and type IIa diamonds is investigated by microphotographs, using fields of more than 10^6 V/cm. The distribution of electroluminescence inside the crystal is rather inhomogeneous, and the light patterns are found to be characteristic of each individual diamond. As long as the field strength is not too high this pattern remains constant over long periods and gives a good picture of the submicroscopic defects in optically clear crystals. At very high electric fields and high current densities graphite whiskers develop inside the diamond at the points of contact with the electrode. These lead to a considerable local increase in field strength and, consequently, in electroluminescence. The oscillograms show that electroluminescence in diamond is due not only to excitation by electron collisions but also to the recombination of electrons and holes in barrier layers. 8 illustr, 16 ref, 1 table. *H* *C 2.24*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

Measuring elastic moduli by ultrasonics

Bell Labs. *Electronics* 1957 Vol 30 (9) pp 214, 216 (Sep)

An instrument is described which determines elastic moduli by measuring the velocity of the propagation of vibrations within the specimen. A photograph of the test set-up shows a diamond specimen in position. 1 illustr. *W* *C 2.22 : C 2.29*

Brief gemmology. Kleine Edelsteinkunde

A. Helfrich-Dorner. *Die Uhr* 1956 (21) pp 30-34 ; (24) pp 28-31 ; abstr *Ann Franç Chron* 1957 Vol 11 Ser 2 (3) p 155 (Original in German)

H *C 2.7*

The theory of the binding energy in non-polar crystal lattices. Theorie der Bindung in unpolaren Kristallgittern

F. Hund. *Z Electrochem* 1957 Vol 51 (8) pp 891-895 (Dec) (In German)

Introductory lecture to the 56th general meeting of the Deutsche Bunsengeselschaft fuer physikalische Chemie, Kiel, June 1, 1957.

The nature of the non-polar bond in crystalline materials is described in simple terms, and some of the physical properties of crystals, including diamond, are explained in terms of the electronic structure in the crystal lattice. 9 illustr. *H* *C 2.5*

Summary report of Office of Naval Research, Dept of the Navy fellowship no 1 & ext (from May 1, 1951 through July 31, 1955) under Contract Nonr-044(02) (NR 032-401)

W. J. Kirkpatrick (Mellon Inst Ind Res, Pittsburgh, Pa). US Govt Res Rep PB 121058 ; *US Govt Res Rep* 1957 Vol 27 (3) p 107 (Mar 15)

A study of transformation mechanisms and related phenomena to produce diamond, graphite, and other carbon-type materials. Based on a hydrocarbon approach to the structure of these carbons, a number of true hydrocarbons are investigated and synthesised. Historical analyses of past investigations were also conducted, and carbon forming mechanisms are explored. 49 illustr.

W *C 2.6 : C 2.61*

Semi-conductors and nuclear radiations

L. Koch. *L'Onde Electrique* 1955 Vol 35 pp 977-980 (Nov) ; *Nuclear Sci Abstr* 1957 Vol 11 (1) p 79 (item 765) (Jan 15) (Original in French)

The permanent, reversible, and transitory radiation effects in semi-conductors are reviewed.

W *C 2.27*

Testing of ceramic materials. Die Pruefung keramischer Roh- und Werkstoffe

H. Lehmann. *Glas-E-K-Technik* 1957 Vol 8 (10) pp 381-389 (Oct) (In German)

A brief survey of methods of testing for various properties of ceramic materials includes the description of methods of grain size analysis and the appropriate apparatus. *H* *C 8.72 : D 7.5*

The strength of sintered corundum

N. M. Pavlushkin. *Steklo i Keram* 1957 Vol 14 (7) p 14 ; *DSIR Transl Contents Lists Russ Period* 1958 (106) p 76 (Jan) (Original in Russian)

X *C 12.0*

A high energy intreference effect of bremsstrahlung and pair production in crystals

H. Ueberall (Cornell Univ). *Dissert Abstr* 1956 Vol 16 (9) pp 1710-1711 (publ no 18,290, 69 pp)

Numerical calculations were performed for Cu, diamond and Pt. *W* *C 2.5*

DIAMOND AND OTHER HARD MATERIALS IN INSTRUMENTS, ETC

Ruling engine features interchangeable heads

VEB-Feinmess Dresden. *Design News* 1957 Vol 12 (16) pp 18-19 (Aug 15)

A circular dividing engine uses 3 different and interchangeable dividing heads. It has a capacity for circular grinding up to 12 in. diameter, and a linear scale dividing capacity up to 8 in. Features include a special mechanism for setting line length, a 6-speed drive, and a line counter which obviates the necessity for supervision. 1 illustr. *W* *C 10.3*

Improved scriber usable on all metals

Greist Mfg Co, New Haven 15, Conn. *Design News* 1957 Vol 12 (13) p 89 (July 1)

The pencil-shaped Micro-Scriber is available in two models : one for fine heavy-duty use, and one for fine detail work. The tip, formed from an alloy of 95% tungsten carbide and 5% cobalt, is diamond ground and lapped, and is suitable for use on all metals. 1 illustr. *W* *C 10.21*

A 20-ft Ebert grating spectrograph

G. W. King. *Journ Sci Instr* 1958 Vol 35 (1) pp 11-14 (Jan)

The design and construction of a new high-resolution spectrograph for the visible and ultra-violet regions of the spectrum are described. In the apparatus, a plane diffraction grating is used with a spherical mirror as collimator and camera. 6 illustr, 7 ref.

F *C 10.21*

Hand stoning

Behr-Manning Co, Troy, NY. *Design News* 1957 Vol 12 (16) p 95 (Aug 15)

A 24-page booklet describes natural and synthetic stones, and gives recommendations on selection and use by tool and die makers, instrument makers, etc.

W *C 2.61*

HARDNESS AND WEAR TESTING

The bases of measurement

H. Barrell. *Inst Prod Engs Journ* 1958 Vol 37 (1) pp 3-18 (Jan)

The author discusses fundamental units and means of producing accurate linear standards with particular reference to the light wave standard. End standards and their applications in the workshop are considered, as are standards of mass, time, angle, force, and hardness. An account of the indenting technique is given, and the apparatus developed by the Nat Phys Lab for providing greater accuracy is described. 9 illustr, 23 ref, 1 table.

F *D 15.0*

Hardness testers project indentation image

Gries Industries Inc, 400 Beechwood Ave, New Rochelle, NY. *Design News* 1957 Vol 12 (19) pp 105, 106 (Oct 1)

The Reflex range of hardness testers project magnified images of indentations. One model has push-button control of loads from 1 to 120 kg (or 250 kg, if desired), and is equipped with a Vickers 136 deg diamond pyramid, Brinell balls of various diameters, the Grodzinski diamond double cone, and the Knoop diamond indenter. Other models are described. 1 illustr. *W* *C 4.0 : C 4.32*

Light induced plasticity in semi-conductors

G. C. Kuczynski, R. F. Hochman (Notre Dame Univ, Indiana). *Phys Rev* 1957 Vol 108 (4) pp 946-948 (Nov 15)

In order to determine the effect of light on semi-conductors, the microhardness of dark and illuminated semi-conductor crystals was studied. A standard Tukon microhardness tester using a diamond Knoop indenter at weights from 1 to 100 g was used for making the measurements. Experimental procedure is described in detail.

It was found that the hardness of a layer only a few microns thick is affected by light : Ge softened by 55%, Si by 70%, and InSb by 20%, when illuminated by ordinary lamps. The effects of crystallographic planes and the wavelength of the incident radiation are discussed. 3 illustr, 2 ref. *W* *C 4.32*

Cam control and spring seat protect indenting diamond

E. Leitz GmbH, Wetzlar, Germany. *Design News* 1958 Vol 13 (1) pp 44-45 (Jan 6)

A new hardness tester, designed for Vickers, Knoop, and scratch hardness testing, has a load range from 15 to 2,000 g. Indentations can be read directly to an accuracy of 0.0005 mm, with a relative measuring accuracy of approximately 0.0002 mm. One of the many features is a spring seat with a number of elastic steel wires which protect the diamond against accidental damage, and which counteract any lateral thrust.
W *C 4.0*

A new standard hardness testing machine

R. S. Marriner, F. C. P. Mason. *Machinery Lloyd* 1958 Vol 30 (2A) pp 39, 41-44 (Jan 25) (Also in German and French)

A new standard hardness testing machine has been designed at the NPL, using tests based on the Vickers method. It is claimed that the construction of this machine eliminates, or materially reduces, the errors from various sources common in earlier machines. 3 illustr, 2 tables. *G* *C 4.0*

Microhardness testing. Die Mikrohaertung [?]

B. W. Mott. *Glas-E-K-Technik* 1957 Vol 8 (10) p 414 (Oct) (In German)

Translated and edited by K. F. Frank, Verlag Berliner Union, Stuttgart. 1957, 290 pp, 157 illustr. Price DM 36.00

International practice in microhardness testing (loads between 1-500 g) is surveyed. The various instruments, methods, and indenters are critically described. The physical processes occurring during indentation are examined, and methods of evaluating the results are illustrated by numerous examples.
H *C 4.32*

Hardness and other physical properties of metals in relation to temperature

E. R. Petty. *Metallurgia* 1957 Vol 56 (337) pp 321-326 (Nov)

Hot hardness is becoming increasingly significant through its relation to other metallurgical properties, *eg* yield point, tensile strength, fatigue strength, creep and creep rupture, crystal structure, and ionic radii. The paper aims at supporting the claim of hot hardness testing as a tool for high temperature deformation studies. The mode of deformation in the 'equicohesive range' is discussed, and used to explain the form of the hardness-temperature relationship for pure metals. The relation between hot hardness and creep is reviewed, and it is concluded that a correlation is possible for all pure metals, and probably also for simple alloys, but the complex age hardening type would not conform easily, if at all. 8 illustr, 38 ref, 1 table.
R *C 2.2*

Micro-hardness testing

R. Wall (Assoc Automation Ltd). *Metal Ind* 1957 Vol 91 (25) pp 521-522 (Dec 20)

The experiences and results of five years of observation are reviewed. The better known forms of apparatus are mentioned and the method briefly described. For metallurgical and production quality control testing, the author's company use a series of small precision clamps for mounting and non-destructive testing of parts. Ferrous parts may be held in position by a small magnet. Plasticine mounting is used where possible. The method covers small hardened springs, thin cyanide case parts, thin strip nickel, chromium, rhodium, etc. For testing steel wire 0.006 in. in diameter and upwards, a special clamp takes 12 samples, a hardness test being made on each cross section. Testing errors are generally caused by poor specimen preparation, vibration of microhardness tester, careless measuring of impressions, insufficient operator experience, materials under test having a marked difference in micro-structure, or failure to interpret the physical metallurgical condition on the material surface. The use of conversion tables for Vickers microhardness figures to Rockwell or Brinell scale should be avoided, as variously published tables do not agree. 2 illustr. *R* *C 4.32*

The surface treatment of high speed steel tools and their application. Oberflaechenbehandlung von Werkzeugen aus Schnellarbeitsstahl und ihre praktische Anwendung

H. D. Weckener. *Werkstatt & Betrieb* 1958 Vol 91 (1) pp 33-38 (Jan) (In German)

Various methods of surface hardening are described and their uses and applications given. The method of testing the hardness of such very thin surface layers is carefully examined. Care must be taken that the depth of indentation does not exceed the thickness of the hardened layer. Vickers indentations under loads varying from 100 g to 3 kg show an apparent increase in hardness up to a maximum at about 200 to 300 g load, followed by a gradual decrease to a steady hardness value. Presumably the surface roughness plays an important role at very low loads, indentations appearing relatively too large, *ie* the hardness would appear to be too low. The maximum measured hardness would thus correspond to the true hardness of the surface layer, and the subsequent reduction in apparent hardness with increasing load is due to the penetration of the indenter into the softer base material. 12 illustr, 38 ref, 2 tables. *H* *C 4.0*

Motorized hardness testers available in two units

Torsion Balance Co, Clifton, NJ. *Design News* 1957 Vol 12 (11) p 100 (June 1)

Available in the 8 and 12 in. vertical capacity, and, by special order, in the 4 and 16 in. sizes, the motorized combination hardness tester can make tests on all Rockwell regular and superficial scales. The major advantage claimed is the elimination of the 'human error' element in applying and removing the major load. 1 illustr. *W* *C 4.0*

Hardness testers

The Torsion Balance Co, Clifton, NJ. *Design News* 1957 Vol 12 (21) p 135 (Nov 1)

A 4-page bulletin describes combination hardness testers designed to make both regular and superficial Rockwell tests. A range of standard and accessory equipment is also described.
W *C 4.32*

Microhardness tester

M. Nishihata. *Nippon T&TPC Electr Communic Lab Rep* 1957 Vol 5 (7) pp 16-19 (July)

An Akashi and a Leitz hardness tester are illustrated. The diamond indenter is pushed into the specimen surface by a dashpot movement in case of the Leitz, tester, while the table of the Akashi tester is raised manually until the specimen is touched by the indenter. Specimens should be polished by electrolysis. Minimum test piece thickness should be 1.5 × the diagonal line (in case of the 136 deg diamond pyramid), or 10 × as long as the depth. Graphs showing the relation between microhardness and test-piece thickness, distribution of the cutting edge hardness, etc, are given. The author believes microhardness testing will open an extensive field of studies. 4 illustr. *R* *C 4.32*

Statistical analysis of a wear process

B. G. Rightmire. *ASME Trans* 1957 Vol 79 (6) pp 1242-1246 (Aug)

Based on M. Kerridge's conclusions on the wear process between a soft-steel rider and a hard-steel ring, an expression for metal transfer during a wear process is formulated in terms of the statistical behaviour of the sliding contacts. 3 illustr, 13 refs.
W *C 4.0*

Hardness tester has push-button control

Opto-Metric Tools Inc, 137 Varick St, New York 13, NY. *Grinding & Finishing* 1958 Vol 3 (9) pp 56, 58 (Jan)

A German-designed hardness tester which can be used for Rockwell C, Rockwell B, Brinell, and Vickers hardness tests, has load selection by push-button control. 8 major loads are available. 1 illustr.
G *C 4.0*

TRUING OF GRINDING WHEELS

Simple counter detects machine drift

Heald Machine Co, Worcester, Mass. *Electr Mfg* 1957 Vol 60 (4) pp 154-155, 177 (Oct)

A new form control system for use on Sizematic internal grinders is described. The system is so designed that it compensates for machine drift and not for random variations.

On Sizematic grinders the size of the finished part is controlled by the setting of the truing diamond, which is mechanically positioned with respect to the OD of the piece to be ground. After a piece is rough ground, the grinding spindle is withdrawn, and the wheel passes by the diamond and is trued. The wheel is again advanced and the piece is finish ground. Wheel wear is used as a guide to the distance the wheel should be advanced before the next cycle. Corrections for machine drift can be made manually by adjusting the diamond setting through a differential screw and double ratchet wheel mechanism; one tooth of the ratchet represents 25 millionths of an inch in diamond setting.

Automatic size control is accomplished by a post-process air gauge which checks each piece. If the piece is either over or under the pre-control size limits, an electrical control closes in a counting circuit. If the next piece is outside the pre-control limit in the same direction, *ie* both under or both over, a circuit is completed which actuates a push-pull solenoid mechanism that changes the position of the diamond by one ratchet setting. If, instead, the next piece is within the limits, a timer automatically drops out the contacts made by the previous piece. 4 illustr.
W *C 12.3*

Grinding wheels

Cincinnati Milling Machine Co, Cincinnati 9, Ohio. *Design News* 1957 Vol 12 (16) p 98 (Aug 15)

A 35-page booklet describes the manufacture, uses, and types of grinding wheels. A section on truing methods is included as well as advice on storage.
W *D 8.0*

FINE BORING AND FINE TURNING OF METALS

French developments in sintered ceramic cutting tools

L. Gion, L. Perrin (Comp Gen d'Electro-Ceramique) *Machinery* (London) 1957 Vol 91 (2353) pp 1420-1430 (Dec 20)

Some aspects of the manufacture of sintered oxide ceramics are discussed with a detailed account of tests carried out to investigate the application and behaviour of the material when used for cutting tool tips. various grades of steel and cast iron were machined, and information obtained on the effects of various rates of feed, surface speed, and depth of cut. Tool wear is discussed, and arguments are advanced for the high performance which may be expected from these tools. Ceramic tools may not prove appreciably cheaper than tungsten carbide, but machining times may be reduced and outputs increased without the need for additional machines. Lathes with provision for changing the feed rate while the spindle is running are particularly suitable. Certain design alterations in existing machine tools may be desirable for the full exploitation of ceramic cutting tools. The ceramic produced by the authors' company is called 'Ceroc'. 16 illustr.
R *C 6.3 : C 8.72*

Excessive dulling is expensive

Anon. *Metal Cuttings* 1958 Vol 6 (1) pp 2-5 (Jan)

The stages of wear in cutting tools were investigated and a division into break in, uniform, and rapid wear or failure was obtained. The importance of resharpening to avoid excessive dulling before the third stage is reached is emphasized. This will result in considerable extension of the life of the cutting tools. 8 illustr.
F *C 12.0*

The machining of light alloys, particularly with carbide tools. Spanabhebende Bearbeitung von Leichtmetall-Legierungen, insbesondere mit Hartmetall-Werkzeugen

Anon. *Technica* 1958 Vol 7 (1) pp 5-10, 15-18 (Jan 3); (2) pp 71-76 (Jan 17) (In German)

Suitable tool shapes and materials are described. Suitable conditions for drilling, thread cutting, milling, reaming, and turning are indicated. For fine boring and polishing, diamond tools are reported to give a brighter finish, to have about 10 times the tool life, and not to require cooling. Suitable carbide milling cutters, scraping tools, planes, and files are also described. 47 illustr, 10 tables. *H* *C 12.6*

The basic set-up for gundrilling

F. S. Bloch (Eldorado Tool & Mfg Corp). *Tooling & Prodn* 1958 Vol 23 (10) pp 67-72 (Jan)

The technique of gundrilling is described, together with a method of manufacturing and using a simple sight gauge which simplifies sharpening. Use of the gauge, with a 180 to 320 mesh diamond wheel, makes possible high accuracy and many re-sharpenings of the carbide tool. 9 illustr. *F* *C 12.21*

Hydraulic tracer and recycle mechanism guides without control

Cleveland Hobbing Machine Co, Cleveland, Ohio. *Design News* 1957 Vol 12 (19) pp 22-23 (Oct 1)

Both rough and finish cutting on a new profile lathe are controlled by a hydraulic tracer and an automatic recycle mechanism. A guide control block guides the roughing operation without contact between tracer tip and template. The recycle mechanism retracts the carriage repeatedly by means of limit switches and stop blocks. The limit switches re-apply the cutting tool to the work after each pass as the tracer and depth control block change the tool advance. 6 illustr.

W *C 6.0*

A simple way to . . . sharpen gun drills

Eldorado Tool & Mfg Corp. *Carbide Engg* 1957 Vol 9 (10) pp 26-28 (Oct)

Only the inner and outer nose angles of gun or "deep-hole" drills require sharpening, and these may be sharpened several times before a complete nose regrind is required. A 'sight' gauge may be made from a piece of screw stock at least 4 drill diameters long, to which the profile of the gundrill is imparted. A gauge is required for each drill diameter. Width of wearland is the determining factor for resharpening. Gundrills may be resharpened until there is practically no sintered carbide left. At 0.005 in. per sharpening, tool length amounts to about 200 sharpenings; 180 to 320 mesh peripheral diamond wheels are recommended for highest efficiency. 6 illustr. *R* *C 6.2*

Diamond points from 3/32 to 1 in. diameter

Elgin Nat Watch Co, Abrasives Div, Elgin, Ill. *Carbide Engg* 1958 Vol 10 (1) p 29 (Jan)

Diamond impregnated points in sizes between 3/32 and 1 in. diameter, and hones in standard or special sizes, are announced by the Abrasives Div of the Elgin Nat Watch Co. A new blending process is said to give good control of diamond concentration. 1 illustr.

G *D 8.0*

Ceramics for cutting tools

J. Lomas. *Machinery Lloyd* 1957 Vol 29 (26A) pp 58-59 (Dec 28)

The advantages and limitations of ceramic tools are reviewed. Their principal employment, apart from cutting, is finish machining at 3,000 ft/min. It is thought that the full potential of the material has not yet been explored. Higher speeds and feeds than with tungsten carbide tools are likely to be achieved. The material is economical due to its abundance and the reduction in the number of grades. Ceramic tools are sharpened by dry grinding with metal bonded diamond cup wheels, 150 mesh being recommended for forming and roughing, 320 mesh for finishing. A narrow 7 deg negative land at the cutting edge is applied offhand with a vitrified bonded diamond hand hone. For roughing, some operators prefer a 220 mesh diamond wheel with a coolant, or a 180 mesh resin bonded wheel, with a 220 or 320 mesh wheel for finishing; or 100 mesh resin bonded proceeding to 500 mesh. 1 table.

R *C 12.9*

Raybrook precision honing machine, model 312

Raybrook Precision Honing Co Ltd, Durkur Low Lane, Wakefield, Yorks. *Metalworking Prodn* 1958 Vol 102 (2) pp 81, 83 (Jan 10)

The Raybrook 312 precision honing machine is described. The machine deals with holes from 0.120 to 2.625 in., and is equipped for both wet and dry honing. Features are described which are claimed to give the machine improved accuracy with economical power consumption. 1 illustr. *F* *C 13.3*

An ultrasonic drill for boring small holes in hard materials

N. K. Marshall (Lockheed Aircraft Corp). *Ind Diamond Rev* 1958 Vol 18 (206) pp 17-19 (Jan)

A specially shaped waveform is used to drive a magnetostriction transducer at an operating frequency of 28 kc/sec to produce a rotating 'jack-hammer' action which speeds up the drilling process and increases the accuracy of the finished hole. A diamond-paste loaded brass drill, 0.015 in. in diameter, is loosely held in the transducer head and is driven into an automatic rotary motion by the special waveform. High precision straight holes of uniform diameters as small as 0.005 in. are produced in glass-hard materials with good repeatability. 1 illustr.

W *C 12.9*

Ceramic oxide cutting tools. Oxydkeramik als Schneidstoff

R. Schmitz. *Techn Mitt* 1957 Vol 50 (9/10) pp 377-378 (Sep-Oct) (In German)

The development and special properties of aluminium-oxide cutting tools are briefly surveyed. Perfect finish is essential for good performance, and these tools must therefore be ground with diamond wheels. Good cooling and low pressures are vital. Grinding should be carried out in two stages using grain sizes D100 and D30 at speeds of 9-12 m/sec. A diamond hand file inclined at 45° should be used on the tool edge.

H *C 12.21*

The influence of lead on metal-cutting forces and temperatures

M. C. Shaw, P. A. Smith, E. G. Loensen, N. H. Cook. *ASME Trans* 1957 Vol 79 (5) pp 1143-1154 (July)

Paper to The Semi-Annual Mtg of ASME, Cleveland, Ohio, June 17-21, 1956.

Results are presented of an investigation into the cutting forces and temperatures produced when machining steel having lead and sulphur additives. Tools of HSS were used during the investigation, and results were checked against similar investigations in which sintered carbide tools were used. Steel containing lead produced thinner chips at all temperatures; sulphur was most effective in this respect at temperatures below 900° F (482° C). 17 illustr, 17 ref, 3 tables. *W* *C 6.5*

What makes precision spindles precision spindles ?

E. W. Pennington. *Tooling & Prodn* 1958 Vol 23 (10) pp 84-86 (Jan)

A high-precision head-stock designed by M. Leblans, and the 'zero spindle' of the Woodworth Co, both designed to facilitate accurate positioning, are compared. Each is based on the principle of reducing the 6 possible modes of movement to one freedom of motion, *ie* that of rotation. Leblans' design incorporates a vibration-free drive which gives a good surface finish. 3 illustr. *F* *C 6.3*

The maintenance of tools. Instandhaltung der Werkzeuge

Anon. *Montan Rdsch* 1957 (10) pp 270-273 (Oct) (In German)

An exhibition of this name was held in Austria from Feb 16 to June 22, 1957. The author stresses the need for early and proficient re-grinding of tools, for suitable grinding equipment, and trained personnel.

H *C 12.0*

Carbide and sapphire tools for turning and burnishing pivots

Bergeon & Co, Le Locle, Switzerland. *Journ Suisse d'Horlogerie* 1957 Vol 82 (9/10) pp 381-382 (Sep-Oct)

6 illustr. *H* *C 6.0*

On the determination of chipbreaking steps and grooves on lathe tools with carbide inserts. Sulla determinazione del gradino rompitruciolo e della gola rompitruciolo di utensili per tornio con placchette di carburi

D. Descalzi. *Macchine* 1957 Vol 12 (11) pp 1045-1047 (Nov) (In Italian)

A general note on the reasons for the provision of chipbreakers is followed by illustrations of various forms. Tables of tool geometry using these forms are given. The greater ease of working, and better finish obtainable, by the use of diamond wheels is stressed. 5 illustr, 2 tables. *G* *C 6.2*

The spiral point drill—a new concept in drill point geometry

H. Ernst, W. A. Hagerty. *ASME Prep* 1957 (57-A-98)

The development of a three dimensional spiral point shape, and the method of generation, are described. Comparisons are made with the conventional chisel point. A number of illustrations in the form of microphotographs is provided. 9 ref.
G *C 6.0*

Investigation of chatter vibrations on lathes. Untersuchung von Ratterschwingungen Drehbaenken

W. Hoelken. *Ind-Anzeig* 1958 Vol 80 (1) pp 1-10 (Jan 3) (In German)

Self-excited lathe vibrations in the system headstock-workpiece-tailstock are investigated experimentally. The cutting force varies with the chip thickness. The causes and prevention of chatter are described. Chatter can be reduced by keeping the coefficient of chip thickness small, and adjusting the direction of the cutting force relative to the main direction of the chatter. Examples are given. 27 illustr, 29 ref.
H *C 6.5*

Carbide cuts boring bar costs

Kennametal Inc. *Canad Machinery* 1958 Vol 69 (1) p 74 (Feb)

Describes economies effected by the use of carbide encased boring bars with throw-away carbide inserts, with particular reference to the production of diesel engines. 1 illustr. *G* *C 6.22*

Abrasive cutting off. IV. Machine guards. Le tronçonnage par abrasion. IV. La protection sur les machines

R. Robin. *Machine-Outil Franç* 1958 Vol 23 (128) pp 93, 95, 97, 99 (Jan) (In French)

Wheel guards and dust aspirators are described. Details of some particular machines are given. 13 illustr, 1 table. *H* *D 7.0*

CUTTING AND MACHINING OF GLASS

Glass industry in USSR

I. Ben. *Indian Ceramics* 1957 (12) pp 362-364; abstr *Glas-E-K-Technik* 1957 Vol 8 (12) p 488 (Dec) (abstr in German)
H *C 7.0*

LITERATURE REQUESTS
Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

The microhardness of glass surfaces. Ueber die Mikrohaerte von Glasoberflaechen

P. Joos. *Z angew Phys* 1957 Vol 9 (11) pp 556-561 (Nov) (In German)

Glass, in bulk, is a brittle material, *ie* it fractures before any plastic deformation has taken place. The experimental critical load for fracture is only about 1/10th of the value calculated from the elastic constants. On the other hand, micro-indentations, and examination of diamond scratches in glass, show that plastic deformation takes place long before cracks occur, and that the limiting specific loads far exceed the critical loads for the bulk material.

After reviewing some previous explanations of these anomalies, the author suggests that the presence of water at the glass surface produces layers of silica gel which reduce the mechanical strength of the glass. This theory is tested experimentally by making microscratches with a diamond into the surface of microscope slides in (*i*) an apparatus carefully evacuated and baked so as to remove all water vapour, and (*ii*) under various pressures of water vapour. Electron microphotographs show how the trace of the scratch changes from a broad track with deep cracks at right angles to the trace, to a narrow scratch with smooth, well-defined edges as the pressure of water vapour is increased. These experiments also support Smekal's theory of glass polishing, and demonstrate that glass should always be polished wet. Dry polishing can give satisfactory results only if the glass surface is already saturated with water, or if the water vapour pressure of the ambient atmosphere is sufficiently high. 13 illustr, 22 ref.
H *C 4.32 : C 7.0*

The problem of tension in a plane in vertically drawn window glass. Das Problem des ebenen Spannungszustandes in vertikal gezogenen Fensterglasscheiben

P. Gilard jun. *Rev Univ Mines* 1952 Vol 8 Ser 9 (11) pp 426-437; *Glastechn Ber* 1958 Vol 31 (1) p 28 (Jan) (Original in French, rev in German)

The tensions in a plane are examined photo-elastically and conclusions are drawn as to the liability to fracture.
H *C 2.221 : C 7.0*

Glass technology. Technologie des Glases

I. I. Kitaigorodsky. *Glas-E-K-Technik* 1957 Vol 8 (12) pp 492-493 (In German)

Edited in Germany by J. Winkler, R. Oldenburg Verlag, Muenchen, and Verlag Technik, Berlin. 1957, 723 pp, 300 illustr, 83 tables. Price DM 58.
H *C 7.0*

MACHINING OF STONE, ETC

Huge diamond saws

Anon. *Mineralogist* 1958 Vol 26 (1) pp 42, 44-45 (Jan)

Stone cutting and lapidary saws are compared in a general note with some reference to historical developments. *Y* *D 8.0*

ROCK DRILLING

Experimental drilling with sectional turbine drills

V. N. Polyakov. *Neftyanoe Khozyaistvo* 1957 (11) p 49; *DSIR Transl Contents Lists Russ Period* 1958 (106) p 59 (Jan) (Original in Russian)
X *C 9.0*

A method and device for rock drilling. Verfahren und Vorrichtung zur Durchfuehrung von Bohrungen

Anon. *Bohrtechnik & Brunnenbau* 1958 Vol 9 (1) pp 20-22 (Jan) (In German)

Review of German patent DBP 870,383, Class 5a, group 17, for ensuring (*i*) that bore holes are straight, even when the strata of soft rock bends or, alternatively, (*ii*) ensuring that the hole follows the soft strata. The shaft holding the boring crown is held in the centre of the hole by cylindrical shoes pressing against the sides of the hole. When the crown meets harder rock the higher resistance on one side tends to deflect it but in (*i*) the rigid clamping of the shaft prevents any lateral displacement. In (*ii*) the crown is linked to the shaft by a ball joint, and the shaft itself is subdivided into several sections, each provided with a set of clamping shoes and linked to the next with ball joints. 3 illustr.
H *C 9.0*

Keys to successful competitive drilling. VIB

R. A. Bobo, G. S. Boudreaux, R. R. Angel (Phillips Petroleum Co). *World Oil* 1958 Vol 146 (1) pp 127-129, 132-133, 136 (Jan)

The advantages in penetration rates for air drilling over mud drilling are shown graphically, and a table is given for obtaining the approximate circulation rates. The design of equipment is examined. The problem of water zones, of pipe stress, and of hole deviation (which can be up to 40° and necessitates large reductions in bit weights) are discussed. Some possible solutions for these problems are suggested. 9 illustr, 3 ref, 1 table.
F *C 9.0*

Rock hardness and its bearing on underground water flow

V. L. Bosazza. *Mining Mag* 1957 Vol 97 (4) pp 201-211 (Oct)

An attempt was made to correlate rock hardness of Karroo formations on Witwatersrand quartzites as measured by the percussion drill, electrical resistivity as measured from an expanding depth probe, and the results of an electrical resistivity log down the borehole, and to correlate the nature of the rocks with the drilling rates. Wilson's figures have been plotted and show the percentage to volume of minerals harder than 7 against the life of diamond bits in feet. Few data were obtained, but a regular relationship clearly exists between diamond bit life and the volumetric proportion of minerals of hardness 7 (mainly quartz). The rotary diamond drill is not ideal for measuring hardness, being a measure of shear and impact, but the study showed merit in the use of actual drilling for the measurement of hardness in the field. The electrical resistivity depth probe is a useful indicator of rock hardness at high values, *ie* above 10,000 ohm/cm, but not below this value. Log electrical resistivity to log drilling rate is a straight line function, although there is scatter. 14 illustr, 12 ref.
R *C 9.0*

Constant pressure ensures greater economy in rotary drilling. Billiger Bohren durch konstanten Bohrdruck

H. Mueller-Waldeck. *Industriekurier* 1958 Vol 11 No 6 (1) p 6 (Jan 15) (In German)

The load on the hook is measured by means of the expansion of a cylinder of special steel. The movement of this cylinder displaces a ferromagnetic core situated in an air gap between two solenoids which form two arms of a Wheatstone bridge. A small movement of the cylinder thus produces a considerable variation in the impedances of the two arms, and thus a deflection of the indicator which can be calibrated directly in tons-load on the hook. A similar instrument is used to measure the pressure on the tool bit at the bottom of the hole. 2 illustr.
H *C 9.0*

Craelius XH-60 and XH-90 diamond core drills

Craelius Co Ltd, 12 Clarges St, London W 1. *Min Mag* 1958 Vol 98 (1) pp 60-61 (Jan)

The XH-60 and XH-90 drills are new products of the Svenska Diamantbergborrnings AB of Stockholm. They are designed to break down into sub-units each of which weighs less than 500 kg for ease of transport. The controls are conveniently grouped for operation, and many of the actions are carried out hydraulically. 1 illustr.
G *C 9.21*

Improvements in design and manufacturing techniques achieve maximum core recoveries, increase life and reduce down hole troubles. I

J. P. Jeffers. *Mindrill Bits,* etc 1957 Vol 8 (6) pp 1-2 (Aug)

'Face discharge' stationary split inner tube core barrels are interchangeable with the standard 'X' series, and may be used where difficult coring ground or ore is encountered. The split inner tube has been developed for the 'M' series for soft and friable formations, non-split tubes being available for solid and less friable material. Ten ft split inner tubes permit drilling through coal seams in one pass. Dry blocking is recommended in soft, fractured or sandy ground, but only if first class drill runners are available, otherwise the diamond bit may be burnt in or wrecked. Several improvements are listed for this series. 1 illustr.
R *C 9.0*

The effects of weight and speed on penetration

A. Lubinski (Pan American Oil Corp). *World Oil* 1958 Vol 146 (1) pp 120-121 (Jan)

A new method which seeks a more accurate determination for the rate-versus-weight law in newly encountered formations in drilling is discussed. By taking readings over 6 instead of 12 ft intervals, the variables are cut down. Fewer readings should be necessary, thereby cutting the costs and the time necessary. 4 illustr.
F *C 9.0*

High mud pressures increase penetration

R. A. Watson, R. S. Sullins (Humble Oil & Refining Co). *World Oil* 1958 Vol 146 (1) pp 113, 115-118 (Jan)

The effects of hydraulic horsepower and weighted muds in increasing penetration rates are discussed. The need for improved chip generation and adequate bit weights for the efficient use of higher hydraulic pressures is stressed, and the need for the use of 5 in. drill pipe and $\frac{3}{8}$ to $\frac{1}{2}$ in. nozzle size explained. 7 illustr, 1 ref.
F *C 9.0*

Flushing problems in deep drilling. Spuelungsprobleme bei tiefen Bohrungen

S. Peter. *Erdoel Zeits* 1958 Vol 74 (1) pp 11-19 (Jan) (In German)

Lecture to the mtg of the Verein fuer Tiefbohrtechnik, Bad Oeynhausen, Nov 2, 1957. 9 illustr, 6 ref.
H *C 9.0*

WIRE DRAWING

Diamond wire drawing dies

British Diamond Die Federation. *Met Ind* 1957 Vol 91 (17) pp 353-357 (Oct 25); (18) pp 379-381 (Nov 1)

2 illustr, 6 tables. See *Wire Ind* 1957 Vol 24 (285) pp 831-835, 873 (Sep); (286) pp 945-950, 953 (Oct); *Ind Diamond Abstr* 1958 Vol 15 p A10 (Jan); this issue, p A45.
W *C 11.0*

Lubricants for wire-drawing dies. I & II

W. M. Halliday. *Wire Ind* 1957 Vol 24 (288) pp 1145-1146, 1153 (Dec); 1958 Vol 25 (289) pp 59-60, 62 (Jan)

The types of lubricant for wire drawing are described. Sodium base dry soap lubricant has good adherence and prevents metal-to-metal contact, but does not produce a high polish. Wet lubricants are used for high-speed work or where a bright lustre is required. Specialised types of lubricants, and those suitable for alloys, are also discussed, together with the factors governing the choice of a suitable lubricant.

F *C 11.0*

A method of controlling the contour of tungsten carbide dies used in drawing copper wire

W. R. Moyers, G. M. McLeod (Western Electr Co). *Wire & Wire Prod* 1957 Vol 32 (10) pp 1205-1206, 1253-1255 (Oct)

The dial gauge method measures die bearing length by seating the die on a cone and plunger assembly, and inserting a plug gauge into the top or front of the die. The bottom surface of the plug gauge meets and depresses the plunger until stopped by the squared tip of the plug gauge contacting the entrance cone surface. The dial indicator measures and indicates the plug displacement. The axial relationship of the component parts is maintained by a guide sleeve holding the die case in a vertical position, and a bracket above the die locating the plug gauge axis in the vertical plane. The relationship of the plunger displacement indicated on the dial to the bearing length, is a function of the entrance angle, bearing angle, back relief angle, diameter of die opening, and plug gauge diameter; it is expressed mathematically. Measurement accuracy depends on accuracy of back relief, gauging cone and flat surface limiting the plug gauge travel when the plunger is fully depressed. The value for a particular assembly is calculated by a simple formula. Compensation for plunger tip wear is necessary, as well as for inaccurate machining. The method is fast, accurate, and economical, and produces consistent tungsten carbide shapes without requiring skill or maintenance. 5 illustr. *R* *C 11.0 : D 15.0*

Weighing samples of wire to determine accurately the hole size of fine gage diamond dies

W. R. Moyers, G. M. McLeod (Western Electr Co). *Wire & Wire Prod* 1957 Vol 32 (10) pp 1219-1220, 1273, 1275 (Oct); *Ind Diamond Rev* 1958 Vol 18 (206) pp 15-16 (Jan)

A formula for computing the weight of a known length of any wire diameter was based on the assumption that the density of copper is 8.89 gm/cm³ at 20 deg C. The theoretical American wire gauge diameters were calculated and used in the formula. This gave a table of weights for each gauge size. Wire tolerances were calculated in the same manner. The average diameter of a wire produced by a die could be determined by weighing measured lengths. To overcome the problem of variations in hand and machine drawn wire, a hand powered machine consisting of a die holder, pulling capstan, and measuring wheel, was made. Diameters of the refinished diamond dies are checked by drawing a wire of the next larger gauge through the die opening, wrapping it around the capstan, and fastening it to the measuring wheel, which is given a specified number of turns. These are cut, producing samples for weighing. Wire roundness is checked with a barrel micrometer. A sample machine was also made for intermediate wire sizes. The average diamond wire die size may be controlled by weighing measured lengths. Weighing wire samples has increased die life, and provided a tool allowing closer resizing of dies. 4 illustr. *R* *C 11.0 : D 15.0*

Tests carried out on diamond wire-drawing dies

British Diamond Die Federation. *Wire Ind* 1957 Vol 24 (286) pp 945-950, 953 (Oct)

The Federation set out to ascertain whether diamond dies produced in Great Britain are inferior to those produced abroad, but no evidence of this was found. The conclusions from tests on copper drawing dies were that profile, polish, and stone size are of minor importance, the quality of the diamond being the dominant factor in drawing performance. After a random examination of stainless steel drawing dies, a further examination was carried out on a series made by one manufacturer. The dies were all supplied at 0.0143 in. diameter, and used for drawing 18 : 8 type austenitic steel wire. The orientation of diamonds was effected by an X-ray method without removing the diamond from the die. The method also serves for observations regarding the condition of the diamond, and mounting faults. Dependence of die life or wear on crystallographic orientation has not been established, and would require examination of a larger number of dies. A random selection of dies revealed a concentration away from the 'four-point' direction. Most diamonds appeared oriented in a direction dependent on practical considerations. Drawing results with various diamond die makes are tabulated. 4 illustr, 4 tables. *R* *C 2.5 : C 11.0*

The texture of drawn tungsten wires

G. D. Rieck. *Philips Res Rep* 1957 Vol 12 (5) pp 423-431 (Oct)

According to a 1924 paper by Z. Jeffries, drawn tungsten wire has a texture with the [110] axis of the grains in the wire direction, and their (001) planes parallel to the surface of the wire. The experiment described proves by x-ray diffraction measurements that tungsten wire has the generally accepted normal fibre texture with a random orientation of the crystals around the [110] fibre axis. 5 illustr, 4 ref, 4 tables.

W *C 11.0*

Basic investigations into the crystallography of cold drawn music wire

US Nat Bur Standards. *Wire Ind* 1957 Vol 24 (288) pp 1121, 1152 (Dec)

An investigation of preferred crystal orientation in cold drawn music spring wire revealed that the degree of preferred crystal orientation, and the elastic modulus of the wire, first increase, then decrease, as the diameter is reduced in the drawing process. Tensile strength of the wire increased with each reduction in size, but showed no correlation with changes in preferred orientation or modulus of elasticity. Wire drawn from steel of 0.85% carbon content was used, the diameter being 0.111 in. Eleven dies were used for reduction to 0.039 in. The maximum value of Young's modulus occurred at 0.047 in. diameter. The development of preferred orientation seems to be the principal factor in the change of modulus. 2 illustr.

R *C 2.2 : C 11.0*

The relation between forces during wire drawing in hard dies

N. T. Deordiev. *Vestn Masstro* 1957 Vol 37 (10) pp 51-53; *Inhaltsverzeichnisse sowjet Fachzeits* 1957 Vol 6 (12) p 1276 (Dec) (Original in Russian)

H *C 11.0*

On the qualification of copper wires. I

K. R. Vassel. *Hungar Journ Metallurgy* 1957 Vol 12 (9) pp 79-81; *Hungar Techn Abstr* 1957 Vol 9 (4) p 127 (Original in Hungarian)

X *C 11.0*

Lubrication in wire drawing

J. G. Wistreich. *Wire Ind* 1957 Vol 24 (286) pp 954-955, 958 (Oct)

The fundamental research of the last few years has led to a clearer understanding of the mechanism of lubrication. According to Wistreich, mean die pressure may range from 10^5 lb/in^2 for soft aluminium, to 5×10^5 lb/in^2 for hard steel-rope wire. Mean interface temperatures up to 308 deg C have been recorded at 100 ft/min when drawing high carbon steel wire, temperatures in excess of 500 deg C being fairly common in industrial machines. Organic wire drawing lubricants stand up to these temperatures due to the short duration of time during which they are subjected to them. When finish is unimportant the wire is drawn dry with soap powder. Wet drawing is used for lustrous or clean surfaces. Hard metal or alloy wires are coated before drawing. Recent research has shown that lubrication in dry drawing is not essentially of the boundary type, but varies, with features reminiscent of the fluid regime. Forced lubrication may be effected by using the wire itself to pump the lubricant to the required pressure. The experiments of D. G. Christopherson and others (1954, 1955) are described. Although the theory of forced lubrication is in its infancy, soap powder seems a suitable medium. The interdependence of variables which makes the mechanism of forced lubrication complicated also gives the system great flexibility, which has not yet been fully explored. 4 illustr. [For part II see *Ind Diamond Abstr* 1958 Vol 15 p A27 (Feb)].

R *C 11.0*

Phosphate and waterglass coating of wire for drawing

I. M. Goncharov & coll. *Stal'* 1957 Vol 17 (5) pp 464-465 (Original in Russian)

The advantages and methods of phosphate coating steel wire are described, the principal advantages being (*i*) longer die life, (*ii*) smoother drawing, (*iii*) better working conditions in the wire mill, and (*iv*) avoidance of the coppering operation. A composition of waterglass replaces the liming and coppering stages.

[Transl av, H. Brutcher, PO Box 157, Altadena, Calif, price $5.90, No 4076]. *W* *C 11.0*

Determining the speed of deformation in extrusion and in drawing

J. Kocsis, L. Zacher. *Hungar Journ Metallurgy* 1957 Vol 12 (9) pp 71-75; *Hungar Techn Abstr* 1957 Vol 9 (4) p 127 (Original in Hungarian)

X *C 2.22*

Formation of copper debris (flitter) on copper wire

E. Lindau. *Erzmetall* 1957 Vol 10 (10) pp 504-509 (Oct); *BNF Bull* 1958 Vol 38 (342) p 7 (Jan) (Original in German)

This debris consists of metallic Cu particles existing on drawn wire, but not metallically joined to it. Measurements were made of the amount present on various wires and of origin, and recommendations are given for its avoidance. *Y* *C 11.0*

Various flat and shaped wires offered with mirror finish

Techalloy Co Inc, Rahns, Pa. *Machinery* (NY) 1958 Vol 64 (6) p 150 (Feb)

Wires of nickel alloys and stainless steels with a mirror finish have been made available. It is claimed that this finish aids working since forming tools slide easily on the surface, and there is less chance of corrosion as there is no surface on which corrosive material can collect. *G* *C 11.0*

GRINDING AND POLISHING OF HARD METALS

Automatic sizing and gauging in grinding

Anon. *PERA Bull* 1958 Vol 11 (1) pp 3-8 (Jan)

Means of automatic sizing and gauging are discussed. The usual type consists of a measuring head, a recorder or indicating device, and a control unit. The design of these is examined. A similar unit to facilitate the grinding of cylindrical components to be fitted into bored holes is also examined. 3 illustr.

F *D 15.0*

Dowling type 858 grinder for sharpening engraving cutters

David Dowling Ltd, Roebuck Rd, Hainault, Essex. *Machinery* (London) 1957 Vol 91 (2353) pp 1449-1450 (Oct 20)

The workhead of the horizontal spindle grinder may be swivelled in the horizontal plane, and has a circular scale to facilitate setting to suit the point angle on the cutter. It is mounted on a slide at the side of the base, and is adjustable in a direction parallel with the axis of the grinding wheel spindle (or axially by rotation of a knurled ring). The spindle has a 4 deg taper bore at the nose end to receive the cutter, and may be set by an adjustable stop at the rear end for grinding a predetermined cutting angle on the tool. The work spindle assembly may be swivelled upwards. The spindle takes a 2 in. diameter cup wheel and is driven at 12,000 rpm. 1 illustr. *R* *C 12.21*

Grinding hemispheres of germanium and silicon

D. B. Gasson (Associated Electrical Industries Ltd). *Journ Sci Instr* 1958 Vol 35 (1) p 33 (Jan)

A means of producing polished hemispheres of germanium and silicon with diameters of $\frac{1}{4}$ to 1 in., and a contour accuracy within 0.010 in., is described. A normal bench grinder was used, and polishing was by emery paper, and finishing by metal polish, diamond impregnated cloth, or buffing wheel. 3 ref.

F *C 13.0*

The control of quality in automatic production

J. Loxham. *Inst Prod Engs Journ* 1957 Vol 36 (11) pp 676-698 (Nov)

Automatic production processes are divided into 2 groups, *ie* (*i*) stable, with a slow drift in size in relation to time, (*ii*) unstable, with a rapid drift in size. The unstable processes include plain and plunge type cylindrical grinders, those producing parts to predetermined tolerances, through-feed and plunge type centreless grinders, and surface and internal grinders. In some cases, *eg* plunge type centreless and internal grinding, automatic wheel truing is provided. The importance of controlling product quality during the manufacturing process by the control devices described is stressed. If final independent inspection is required, it may be carried out by mechanised final inspection equipment. Two machines for this purpose are illustrated. 31 illustr.

R *C 5.3 : D 15.0*

Regrinding Sendzimir mill work rolls

A. I. Palm. *Grits & Grinds* 1957 Vol 48 (5) pp 3-8 (May); *Ind Diamond Rev* 1958 Vol 18 (206) pp 10, 12-14 (Jan)

The problem of choosing the correct grinding wheel is discussed, and 10 hints on the grinding process are given. The abrasive required depends on the nature of the rolls, the smallest ones requiring lapping with diamond paste. Results and production achieved with diamond wheels are quoted. 3 illustr.

W *C 12.21 : C 13.2*

New opinions on grinding and polishing especially of metallographic specimens. I

Z. Ministr. *Hutnik* 1956 Vol 6 (9) pp 257-262; *Ind Diamond Rev* 1958 Vol 18 (206) pp 7-10 (Jan)

Abr of lecture to the Metallographic Exposition, Prague, May 1956.

The article includes a section on polishing with diamond powder, and emphasises its particular suitability as an abrasive in the very fine grinding of metallographic specimens. (To be concl). 4 illustr, 1 table. See *Bibl Ind Diamond Appl* 1957 Vol 14 p B88 (May). *W* *C 12.61*

Are you using the right silicon carbide wheels [?]

R. A. Parke. *Grits & Grinds* 1957 Vol 48 (8) pp 3-11 (Aug)

The variables affecting the choice of mesh size, grade, structure, and bond in silicon carbide wheels for rough grinding sintered carbide tools are discussed, *ie* grinding pressure, area of grinding contact between carbide and wheel, carbide grade (a soft, self-truing wheel being essential for the harder, more abrasion resistant carbide grades), cylinder *vs* straight wheels (both being used), wet *vs* dry grinding (carbide single point tools are generally ground wet, small precision boring bits being resharpened dry), grinding carbide alone *vs* carbide and steel with the same wheel (this may be done by using slightly softer silicon carbide wheels than for grinding carbide only), and wheel structure. Silicon carbide abrasive wheels are made in 2 bond types, vitrified and resinoid. Vitrified bonds are more widely used, and are suitable for fixed feed as well as offhand grinding. Resinoid bonds provide a better finish, but are limited to fixed feed grinding. 5 illustr, 1 table.
R *C 12.21*

The grinding mechanism and the number of passes. Der Mechanismus des Schleifens und die Ueberschliffzahl

J. Peklenik. *Ind Anzeig* 1958 Vol 80 (1) pp 10-17 (Jan 3) (In German)

The grinding mechanism is investigated by means of a statistical analysis of measurements of the temperature produced at individual grains during grinding, and the actual distance between grains. The method consists in inserting a thin Pt-wire into a very small hole in the workpiece, where it is fixed with insulating shellac. As each grain of the grinding wheel cuts the surface some wire is cut as well, local welding occurs, and the assembly acts as a Pt-steel thermocouple which records (*i*) a sharp peak as each grain severs the wire, and (*ii*) a background level of the temperature during grinding of the workpiece. The distance between peaks is a measure of the distance between the grains on the wheel. The results of this investigation show that the effective distance between grains depends on the feed and the grain size, being larger for fine grained wheels than for coarse ones. From the results the number of necessary passes can be calculated for any given conditions. 19 illustr, 9 ref, 3 tables.
H *C 12.9*

New experiences in honing dies. Neue Erfahrungen beim Honen von Matrizen

G. Haasis. *Draht* 1958 Vol 9 (1) pp 12-13 (Jan) (In German)

The smooth surface of honed dies prolongs their life time, saves the time for replacing dies, and reduces machine wear. For dies of more than HRC 60 kg/mm² diamond honing sticks can be used. Their life time is much increased by reversing their direction of rotation after every 20-25 dies. Pressure lubrication is of great advantage. Many manufacturers also hone the conical sections of reducing dies, thus improving their lifetime 3-4 ×. 1 illustr, 1 table. *H* *C 13.3*

Deep-hole drilling with carbide insert tools. Esecuzione di fori profondi con punte a reporti in carburo

F. W. Lucht (Gen Electr Co), J. Oxford (Nat Twist Drill & Tool Co). *Macchine* 1957 Val 12 (12) pp 1137-1146 (Dec) (In Italian)

Methods of grinding carbide-insert gun drills are described that make chip removal easier, and make it possible to leave a central core, so avoiding the very low cutting speeds (down to zero) that occur at the centre of a normal drill, and allowing the feed to be increased by a factor of four. The importance of correct tool geometry is stressed. 24 illustr.
G *C 6.0*

Grinding wheels

Simonds Worden White Co, 1101 Negley Pl, Dayton 7, Ohio. *Design News* 1957 Vol 12 (24) p 98 (Dec 15)

Choice of abrasives for different metals and applications is one of the subjects dealt with in the 16-page bulletin. *W* *C 5.0*

Safeguarding off-hand grinders

F. E. Riley. *Machine Shop Mag* 1958 Vol 19 (2) p 84 (Feb)

The master switch for the grinder motor is operated by bringing the transformer shield into the safe position. In this way operators are prevented from grinding with the shield raised. The author stresses the need for regular cleaning of the shield, and good lighting to reduce operators' objections to shields. 1 illustr.
G *C 12.3*

Grinding and machining carbides. II

J. W. Ripple (Carborundum Co). *Carbide Engg* 1957 Vol 9 (10) pp 19-22 (Oct)

A special metal bond wheel has been developed with better performance than resin bonded diamond wheels at speeds over 12,000 ft/min. This means that machine conversion will produce resinoid bond cutting rate and metal bond life with 90% estimated savings in diamond wheel cost. Coolant pressures up to 30 or 40 lb/sq in. are required. L and J grade diamond wheels were tested with light and heavy infeeds. The efficiency ratios were 37 and 27 respectively at 0.0005 in. infeeds, both dropping to 4 : 1 at 0.002 in. Diamond wheel life is halved by dry grinding. The tests were conducted with kerosene wick. Mist systems are recommended. 3 illustr. *R* *C 12.2*

The re-servicing of carbide tools

Wickman Ltd. *Machinery* (London) 1958 Vol 92 (2357) pp 136-147 (Jan 17)

The respective merits of reservicing tungsten carbide tools by conventional and spark erosion methods are discussed. Where feeds in excess of 0.010 in. are involved, the surface finish and cutting edge produced by spark-erosion are satisfactory without subsequent diamond lapping, although diamond lapping is normally desirable for work involving feeds below 0.010 in. The time required for spark erosion 'grinding' is longer than the conventional process, but grinding is continuous and shank and tip can be ground simultaneously. The replacement cost of an electrode is low. Spark erosion does not replace diamond grinding but supplements it, with a saving in diamond wheel cost. 31 illustr, 1 table.
R *C 12.2 : C 12.9*

The care and maintenance of tools. Grinding of twist drills. Pflege und Instandhaltung der Werkzeuge. Schleifen von Spiralbohrern

Anon. *Technik & Betrieb* 1958 Vol 10 (1) (insert) (Jan) (In German)

3 illustr. *H* *C 12.21*

The Precise grinder-miller Super 30

Precise Products Corp, Crossens, Southport, Lancs. *Metalworking Prodn* 1958 Vol 102 (2) pp 83, 85 (Jan 10)

The Super 30 is the smallest in the new range of grinder-millers. It weighs 35 oz and has an output of 1/5 hp producing a speed of 45,000 rpm. A precision ground and honed collet chuck permits full visibility over the working area, and quick release for tool changing. The one-piece precision ground quill is supported, with the motor, on sealed self-lubricating precision bearings. In addition to its applications as a hand tool, the Super 30 can be used on lathes, milling machines, etc, by the use of special mounts. Larger models also are reviewed. 1 illustr.

W *C 6.3*

Grinding wheel distributes own coolant

Blanchard Machine Co, Cambridge, Mass. *Design News* 1957 Vol 12 (24) pp 30-31 (Dec 15)

The Centre Column automatic surface grinder incorporates a coolant delivery system through which the coolant arrives at the point of maximum heat, *ie* the leading edge, through the grinding wheel itself. 3 illustr. *W* *C 5.0*

NEW MACHINING METHODS

Effect of pressure between tool tip and workpiece on the rate of ultrasonic machining in Ketos tool steel

D. Goetze (Raytheon Mfg Co). *Acoust Soc Am Journ* 1957 Vol 29 (4) pp 426-431 (Apr)

Experiments in machining were carried out on a Ketos tool steel workpiece with Ketos tool steel tools. Rectangular tool tips having different perimeters, and circular tool tips having different radii, were used with a slurry of boron carbide and water. Equations are derived for relating a critical machining rate and a critical pressure to the ratio of the tool tip perimeter to the tool tip area. On the basis of the equations a phenomenological expression is derived which, for circular and rectangular tool tips, relates the machining rate in general to the pressure in general. 6 illustr, 2 ref. *W* *C 12.9*

Ultrasonic methods for working of gemstones. Ultraschall-Verfahren zur Bearbeitung von Edelsteinen

W. Schiebel. *Zeits Dtsch Ges f Edelsteinkunde* 1957 (19) pp 7-11; *Journ Gemmol* 1958 Vol 6 (5) p 221 (Jan) (Original in German)

This method is now in general use for hard stones such as diamonds, especially when holes with a small diameter have to be drilled. As the cutting and drilling can be controlled easily, this method is also used for engraving stones on a mass-production basis. It should also be possible to produce cabochons and faceted stones by this method. *X* *C 12.9*

The growing versatility of ultrasonic machining

J. Welch (Sheffield Corp, Ohio). *Machinery* (NY) 1958 Vol 64 (6) pp 119-123 (Feb)

A general description of the basic principles of ultrasonic machining is followed by illustrated examples of tools and workpieces. Comparisons are made with other possible methods of machining for difficult materials. 10 illustr. *G* *C 12.9*

Some recent developments in ultrasonic machining

Kerry's (Ultrasonics) Ltd, Tonbridge Rd, Romford, Essex. *Machinery* 1957 Vol 91 (2353) pp 1443-1444 (Dec 20)

An externally threaded cutting tool is mounted at the point of maximum activity of a stub mounted on a transducer which produces ultrasonic vibrations. By this means a torsional movement is imparted. Three equally spaced longitudinal flats on each threaded portion of the wheel permit delivery and discharge of abrasive slurry to the workpiece. A 'tapping size' hole is produced in the workpiece which is mounted in a freely rotating fixture. Axial feed is imparted to the work by the action between the threads on the tool and those which have been cut. Changes in design allow greater flexibility in the use of cutting tools with resulting increases in rates of penetration. 3 illustr.

F *C 12.9*

Ultrafinishing—a new high precision lapping process

T. G. Lewis, jun. *ASME Trans* 1957 Vol 79 (7) pp 1699-1706 (Oct)

The methods and applications of 'ultrafinishing' are described, and the metallurgy of the process is discussed. Laps, abrasives, vehicles, etc, are described. Although aluminium-oxide abrasives are almost exclusively used in low-velocity ultrafinishing, diamond and other hard materials are reported to give excellent results.

In the example chosen to illustrate the high-velocity process, work was performed on materials typical of 440-A stainless steel. Many changes were made in the process, and diamond was chosen as the only suitable abrasive. Surface finish was held to within 0.5-0.3 micro-in. rms. 11 illustr, 4 ref.

W *C 13.2*

Experiments on electrolytic grinding

P. Landberg, J. L. Remmerswaal. *Metaalbewerking* 1957 Vol 22 (22/23); *Metal Res Inst TNO* Commun No 50; *Wear* 1957 Vol 1 (3) p 272 (Dec) (Original in Dutch)

The process of electrolytical grinding of tungsten carbide with a nickel-bonded diamond wheel gives a considerable saving of diamond in comparison with ordinary grinding. The rate of metal removal is greater than by the normal grinding process. The surface quality of the ground work is not as good as with ordinary grinding.

The rate of attack was greater with a more diluted electrolyte and a stronger current. For a better surface quality a weaker current must be used.

X *C 12.9*

Single-point tool reservicing

Wickman Ltd, Banner Lane, Tile Hill, Coventry, Warwicks. *Machinery Lloyd* 1957 Vol 29 (26A) p 71 (Dec 28)

The Erodosharp Mark II embodies 2 refinements on the earlier design: 2 revolving electrodes and adjustable tool rests are provided, and an extractor fan in the machine base permits fumes to be ducted. The machine resembles a conventional grinder, except that 2 iron wheels form the electrodes. Metal particles are removed from the tool by a controlled electrical discharge between electrode and tool across a dielectric gap, *ie* a thin oil film. Tools sharpened by the Erodosharp process last as long as those re-serviced by other methods, while wheel life is claimed to be almost indefinite. The saving in diamond wheel cost is the largest single economy. The process is said to accomplish the same results as diamond wheels, except for lapping superfine cutting edges. 1 illustr.

R *C 12.9*

' Digimatic ' control for contouring machine

J. Rosenberg, W. Broadwell. *Electr Mfg* 1957 Vol 60 (5) pp 104-108 (Nov)

The ' Digimatic ' control system utilizes an all-decimal digital computer and magnetic tape in controlling machine tools. Control of the tool is accomplished by three motor-driven servos which respond to pulse trains on the tape to reproduce the desired motions within an accuracy of ±0.001 in. 10 illustr.

W *C 12.3*

POWDER TECHNOLOGY

A comparison between the specific surface and the grain size distribution of chemically produced metallic powders and their oxides. Vergleich zwischen spezifischer oberflaeche und Teilchengroessenverteilung von chemisch hergestellten Metallpulvern und deren Oxiden

G. Ehrlich, D. Schulze. *Kolloid Zeits* 1957 Vol 155 (1) pp 19-31 (Nov) (In German)

Measurements of the specific surface by the method of gas adsorption are critically compared with particle size measurements obtained from electron micrographs of the powder. Statistical evaluation of the results indicates that good agreement can be obtained within a limited range provided (*i*) the area required for the adsorption of 1 gas molecule is accurately known, and (*ii*) ultrasonic mixing is used to prevent agglomeration of the powders. *H* *D 7.5*

The fixing of dust in wet drilling. Die Staubbindung beim Nassbohren

M. Landwehr, R. Kortner, W. Walkenhorst, E. Bruckmann. *Staub* 1957 (53) pp 841-879 (Dec 15) (In German)

In order to test assertions, often found in literature, that dusts of the order of magnitude which causes silicosis are not sufficiently fixed by water, experimental drillings were made in various types of rock using wet heads, ventilated and non-ventilated, centrally flushed drill hammers, and dry heads. It was found that with wet heads perfect dust control is obtained, even down to sub-microscopic fractions, but decreases as the mixture becomes richer in air. Water is found to be a particularly suitable medium for the fixing of dusts. 21 illustr, 23 ref, 8 tables.

H *C 2.3 : C 9.0*

Modification to a travelling microscope used for measuring x-ray powder photographs

W. E. Armstrong, R. J. Davis (North Thames Gas Board Res Lab, London W 6). *Journ Sci Instr* 1957 Vol 35 (2) pp 59-61 (Feb)

A travelling microscope has been adapted for the measurement of powder photographs by the removal of the cross-hairs, and the attachment of a projector to give a light spot as the reference mark. This overcomes the difficulty that the cross hairs are liable to obscure faint lines on the photograph, and permits the use of a binocular eyepiece. General illumination of the photograph is by a fluorescent tube, and the intensity can be varied. Not only are faint lines more readily seen with this method, but eyestrain, and consequent reduction of accuracy or speed in working, are reduced. 2 illustr, 2 ref. *G* *C 2.4 : D 15.6*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

A rational flow sheet for the grinding and classification of polishing powders for microsections

P. N. Vyalukhin, L. R. Gurevich, Z. M. Zin'kova, V. S. Peselev. *Steklo i Keram* 1957 Vol 14 (7) p 23 ; *DSIR Transl Contents Lists Russ Period* 1958 (106) p 76 (Jan) (Original in Russian)

X *C 8.6*

DIAMOND TOOL PRODUCTION AND DIAMOND RECOVERY

Throwaway applicator for diamond abrasive compounds

Acme Sci Co. *Carbide Engg* 1957 Vol 9 (10) p 36 (Oct)

It is claimed that diamond compound packaged in a rigid plastic throwaway applicator may be applied direct to lap or work, with exact control of the amount used being maintained by the pressure seal plunger. Each applicator contains 5 g of the compound and is protected from contamination by an air seal cap. 1 illustr. *R* *C 13.2 : D 8.0*

Sintered diamond-metal tools for the machining of glass. Gesinterte Diamant-Metallwerkzeuge zur Bearbeitung von Glas

W. Cegielski. *Die Technik* 1957 Vol 12 (10) p 682 (Oct) (In German)

Lecture to the 1st International Congress on Powder Metallurgy, Eisenach, May 28-31, 1957.

The production of fine-grained sintered glass cutters with a W-Cu and Cu-Su base is described. The effect of grain size, diamond content, and sintering temperature on glass cutting tools in which diamond is sintered into a matrix of Cu-Su is examined. The criterion of grinding efficiency is the number of lenses ground in unit time. *H* *C 7.21*

Screening machines. Siebmaschinen

E. O. Riedel. *Techn Mitt* 1957 Vol 50 (11) pp 398-404 (Nov) ; (12) pp 480-486 (Dec) (In German)

The principles of sieving and the demands made on an ideal machine are explained. The various methods and machines are classified, and special problems of construction and the efficiency of these machines are discussed. *H* *D 7.3*

SURFACE FINISH TESTING

Profile unit permits high production testing

Anon. *Design News* 1957 Vol 12 (13) pp 18-19 (July 1)

A Czech-built profile unit measures surface roughness by automatically feeding a diamond point over a test surface with a pressure of 0.035 to 0.01 oz. An inductive transducer converts point deflection into voltages which can be amplified as required. The unit can be adjusted for scanning test lengths from 0 to 2 in. Having 3 types of test points, the device indicates relative surface roughness, absolute deviations from the true geometric profile, and very small internal diameters of tubular pieces. Coarse and fine adjustment of test points is available, and deflection magnification can be obtained in 6 ranges. An adjustable-speed strip-chart recorder makes a graph of the test piece's surface cross-section. 1 illustr. *W* *D 15.4*

Model-100 " Talysurf " portable surface measuring instrument

Anon. *Machine-Tool Rev* 1957 Vol 45 (270) pp 149-150 (Nov-Dec)

The Talysurf 100 offers a compact portable instrument for measuring surface roughness. A sharply-pointed stylus traces the irregularities while a rounded skid provides the datum. The relative movement of the two is used for either a graph recording or an average meter which gives the CLA index. Various scale readings are available. 5 illustr. *F D 15.4*

MISCELLANEOUS

Yearbook for optics and fine mechanics, 1958. Jahrbuch fuer Optik und Feinmechanik 1958

Anon. *Dtsch Uhrmacherzeits* 1958 Vol 62 (1) p 32 (Jan) (In German)

Published by Pegasus Verlag. 288 pp, illustr. Price DM 4.50. *H C 7.0 : D 15.0*

PATENT LISTS

BRITISH

The Official Journal (Patents) 1958 (3598) (Jan 29)

792,358 NORTON GRINDING WHEEL CO LTD (NORTON CO). Reinforced abrasive wheels.

The Official Journal (Patents) 1958 (3599) (Feb 5)

792,790 SVENSKA DIAMANTBERGBORRNINGS AB. Rock drills.

The Official Journal (Patents) 1958 (3600) (Feb 12)

793,071 GENERAL ELECTRIC CO. High strength crystals.

The Official Journal (Patents) 1958 (3602) (Feb 26)

793,621 SCHUETTE, A. H., COMMER, G., WELCKER, L., THEN, E., PECHMANN, E. F. (trading as SCHUETTE, A. H.). Method of grinding helical cutting edges on tools, more particularly milling cutters.

793,957 JONES & SHIPMAN LTD, A. A., and HOULDSWORTH, J. Automatic surface grinding.

793,638 LANDIS TOOL CO. Grinding of ring-like workpieces.

793,641 SPENCER ENGINEERING LTD, J. W. Supplying of cutting fluid to abrasive wheels.

UNITED STATES

Official Gazette 1958 Vol 726 (1-4) (Jan)

2,818,651 H. M. POLLEY, AMERICAN OPTICAL CO. Cutting machine.

2,818,686 M. E. WEISS, GULTON INDUSTRIES INC. Rotating ultrasonic drill.

2,818,692 R. W. BERNSTEIN. Abrasive grinding wheel.

2,818,693 R. W. BERNSTEIN, A. BLOCK. Abrasive wheel.

2,818,696 R. J. S. PIGOTT, GULF RESEARCH & DEVELOPMENT CO. Application of cutting fluids in grinding operations.

2,818,727 M. R. EUVERARD. Hardness testing apparatus.

2,818,850 H. SCHWARZKOPF, J. G. VAN OTTERLOO, CONSOLIDATED DIAMOND TOOL CORP. Cut off blades for abrasive bodies, and their production.

2,819,568 J. N. KASICK. Grinding wheel.

2,819,569 P. ANGENIEUX, ETABLISSEMENT PIERRE ANGENIEUX SàRL. Automatic abrasive liquid distributing device for optical lens polishing machines.

2,819,572 T. G. LEWIS, E. I. DU PONT DE NEMOURS & CO. Lapping method and apparatus.

2,819,584 F. MARTI, G. BRAUNSCHWEIG. Lever escapement.

2,819,708 E. V. STATIA. Radius-to-tangent grinding wheel dresser.

2,820,330 R. A. MAHLMEISTER, SHEFFIELD CORP. Machine tool.

2,820,746 G. F. KEELERIC. Method of making an abrasive tool.

2,821,050 J. F. McCARTHY, SHURON OPTICAL CO INC. Edge grinding machine for lenses.

2,821,052 G. PHANARA. Head for a jeweller's polishing machine.

2,821,364 G. GODFREY. Two-way bit.

SOUTH AFRICA

Official Journal 1957 Vol 10 (53) (Dec) ; 1958 Vol 11 (1-4) (Jan)

Complete Specifications Accepted

2790 R. A. CRESSWELL, J. R. BRADSHAW. AFRICAN OXYGEN LTD (BRITISH OXYGEN CO LTD). Apparatus for electric arc erosion.

AUSTRALIAN

Official Journal 1957 Vol 27 (47-48) (Dec)

211,416 MONSANTO CHEMICAL CO. Styrene-phenolic resins, their preparation, and grinding wheels made therefrom.

SWISS

Patentliste 1957 (24) (Dec)

326,462 SOC D'ETUDE ET D'EXPLOITATION DU PALIER FLUIDE (SEEPF). Machine for drilling hard bodies.

326,620 A. P. PONCET, INDUSTRIES MUSICALES ET ELECTRIQUES PATHE-MARCONI. Long playing needle for reproducing engraved sound records.

326,660 M. L. CHUET. Machine tool for working plane surfaces.

326,661 P. PERRINJAQUEL, DASA SA. Method for polishing truncated bezels of parts of horological movements, and machine for carrying out this method.

FRENCH

Bulletin Officiel 1958 Vol 75 (3846-50) (Jan-Feb)

1,156,530 UNION CARBIDE & CARBON CORP. Method and apparatus for spark machining.

1,156,858 CIE DES MACHINES BULL (CIE FRANCAISE DE MACHINES-OUTILS DE PRECISION). Device for liquid cooling of machine tools for truing grinding wheels, and for like uses.

1,156,861 STARDRILL KEYSTONE CO. Machine for sharpening tools.

1,157,687 GEAR GRINDING MACHINE CO. Machine for forming grinding wheels.

1,157,718 FORD (FRANCE) SA. Supporting plate for abrasive discs.

1,157,995 ENRICO-GUARNERI INDUSTRIAL E COMERCIO SA. Band saw for sawing marble, stone, and similar materials.

1,158,000 IMPREGNATED DIAMOND PRODUCTS LTD. Composition for cutting or abrasive tools.

68,685
971,603 A. AEPPLI. Method and machine for grinding gear wheels having a tooth profile which partly deviates from an involute.

GERMAN

Patentblatt 1958 Vol 78 (4-8) (Jan-Feb)

Applications Open to Public Inspection

1,023,234 H. ILLGEN, W. KNAPPE, VEB CARL ZEISS JENA. Surface tester according to Mechau.

1,023,359 P. KAEPPLER. Device for producing accurate profiles.

1,023,361 K. KLOTZBACH, FRIEDRICH KOCKS GmbH. Device for grinding the calibres of reducing rolling mills.

1,023,364 KARL LAU, ERNST WINTER & SOHN. Diamond grinding or lapping disk.

1,023,537 C. BALLHAUSEN, T. KRALL, DEUTSCHE EDELSTAHLWERKE AG. Arrangement for feeding current to the rotating tool electrode of spark erosion machines by means of a mercury contact.

1,023,694 F. FRANZ. Grinding device for needles, in particular for injection needles.

1,024,397 FA ERNST CARSTENS. Surface grinder with several successive rotary and longitudinally reciprocable grinding cylinders.

Patents Granted

968,308 ELECTRO-ACUSTIC GmbH ZIMMERMANN. Gramophone needle with a leaf spring carrying one or several pins for sound pick-ups.

Inquiries concerning entries in these lists may be directed to Industrial Diamond Information Bureau, 2 Charterhouse Street, London EC 1.

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Recently the Industrial Diamond Information Bureau has been compelled to return a number of applications for copies of articles abstracted in this journal owing to insufficient details being given of the item required. The attention of all users of the Loan Service is drawn to the note appearing in each issue asking inquirers to supply adequate information.

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1957 IDR REPRINTS

The following articles, which appeared in *Industrial Diamond Review* during 1957, are now available, price 1s—post free, from Industrial Diamond Review, 2 Charterhouse Street, London EC 1:

I 243—The reclamation of diamond powder from industrial wastes, by J. Abel.

I 244—Faster carbide grinding with metal-bonded diamond wheels, by J. W. Ripple.

I 245—The impact testing of hard metals, by W. Spaeth.

I 246—Production of sinter alumina cutting tools, by F. Singer and S. S. Singer.

I 247—Mechanized production of instrument jewels, by R. Humphrey and R. E. Leeds.

I 248—The selection of diamonds for industrial purposes, by G. P. Freeman.

I 249—Industrial diamonds from Panna, India, by S. M. Mathur.

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Patent lists are prepared from official patent journals of the major industrial countries, and patent abstracts in general from the printed patent specifications. Printed copies of British patent specifications accepted may be obtained from the Patent Office, Southampton Buildings, London WC 2, at 3s each. Numbers given under British applications for patents are for reference in all correspondence up to acceptance of the complete specification.

The following abbreviations are used :—BP for British Patent, USP for United States Patent, DAS for German Patent Application, DBP for German Patent (GP for German Patents issued prior to 1950), FP for French Patent, Canad P for Canadian Patent, RP for Russian Patent.

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